

Note on the Corona. By Richard A. Proctor, B.A.

A year since, I had occasion to address the Society on the subject of the corona. I then pointed out that no direct sunlight can illuminate the part of our atmosphere which lies towards and around the Moon's place; and the purpose with which I wrote was fulfilled when the views I dealt with were withdrawn from public attention. At that time it seemed to me, on the one hand, very unsafe to theorize about the actual constitution of the corona; but, on the other hand, it seemed demonstrable that the corona is a solar appendage. At present we are, I think, more favourably circumstanced; more especially on account of those photographic successes with which astronomers—as well workers as thinkers—have such good reason to be satisfied.

I propose to place before the April meeting of the Society certain views to which, as I think, the recent observations seem to point. At present, however, my object is merely to note what I take to be by far the most important contribution to our knowledge respecting the corona. I cannot regard the differentiation of the corona into two portions* as an acquisition, simply because for more than a century and a half the distinction had been recognised by astronomers. Nor can I attach any signal importance to the proof afforded by recent observations that the corona has a great extension from the Sun; nor to the confirmation of the long-disputed American observations; because both these points were in effect established before the eclipse took place.

The great result of the recent eclipse observations will be found, unless I mistake, to lie in the association now shown to exist between the configuration of the inner and brighter portion of the corona and its outer and more strikingly radiated portion. This is shown unmistakably by a comparison of the accounts of Lieut. Brown and Prof. Watson with the photographs of Mr. Willard and Mr. Brothers. It was indeed strikingly evidenced during the eclipse of 1869, but not absolutely demonstrated. It seems to me a fact of the utmost importance and significance; more especially when combined with the seemingly established relation between the regions of greatest prominence-disturbance and the expansions of the inner part of the corona, and with that other relation which associates the spot-zones with the larger and more active prominences.

It might seem at first sight that the long radiations opposite the bright parts of the inner corona could be explained as due to the illumination of our own atmosphere in corresponding directions. But the simple consideration of the way in which our atmosphere is illuminated by the corona will show that no radia-

* I would submit that the word "defined" applied in the Report of the Council to the outline of the inner part of the corona, requires to be modified or explained; for undoubtedly the inner corona was not bounded by what is usually understood as a defined outline. The border of this part of the corona showed a rapid but not sudden degradation of brilliancy, having a perfectly soft outline nowhere sharply defined.

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tions extending outwards could make their appearance without corresponding expansion on either side, and a yet more marked extension inwards over the Moon's disk.* The uniformity of the light over the Moon's disk, its faintness, and especially its observed inferiority to that received 15' from the Moon's limb, would suffice to disprove the imagined explanation, which is also, however, opposed to the simplest optical considerations.

I conceive we have now clear evidence of a form of action—but whether eruptive, electrical, or simply repulsive, is not as yet obvious—exerted outwards to enormous distances by the Sun, and with maximum energy over the spot-zones, but local, variable, and probably intermittent.

The annexed woodcut of the spots on the Sun about the time of the Eclipse of December last, should have accompanied Lieut. A. B. Brown's account of the Eclipse as given in the January number of the *Monthly Notices*.



Sun-Spots, Dec. 18, 1870 (12.15 P.M.)

* It was with much pleasure that I heard Mr. Brothers read at the last meeting a letter from Dr. Balfour Stewart, in which views were expressed precisely similar to those above enunciated. In the same letter Dr. Stewart pointed out (as I had shown in the *Monthly Notices* for March, 1870), that though our atmosphere towards the Moon's place is undoubtedly illuminated by light from the prominences, sierra and inner corona, yet that the quantity of light received in this way can bear no higher proportion to the actual light of the corona and prominences than the atmospheric glare in full sunlight bears to such sunlight. It has been this argument—absolutely demonstrative, despite its extreme simplicity—which has caused me for many months past to feel complete certainty respecting the general nature of the corona.